



Collection of Regolith Experiment

Problem Statement

- Understand how to collect and interact with the fine dusty regolith on asteroids, moons, or comets with very low surface gravity.
- This flight opportunity provides a functional test of a regolith collection device as well as provides data on the response of a dusty surface to unmanned landers
- NASA exploration division and planetary scientists are the prime beneficiaries of CORE.

Technology

Development Team

- Dr. Joshua Colwell, University of Central Florida, jec@ucf.edu.
- Experiment funding is provided by the Center for Microgravity Research and Education at the University of Central Florida. The P.I. (Colwell) is the point of contact.
- NASA is the most likely partner in this technology development.

Proposed Flight Experiment

Experiment Readiness:

- The experiment will be ready to fly November 15, 2012

Test Vehicles:

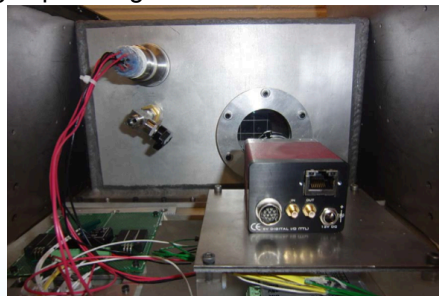
- The experiment requires the long duration microgravity afforded by suborbital launch vehicles.

Test Environment:

- Some components of the experiment have been operated in microgravity on board the space shuttle. The requested test environment is free fall with residual acceleration less than 0.001 g.

Test Apparatus Description:

- The experiment is housed inside a vacuum chamber mounted to a baseplate that also mounts the experiment microcontroller. The experiment is automated and triggered by an accelerometer. During free fall, a regolith sample is exposed and a collector is deployed. The experiment is recorded by high speed digital video.



Technology Maturation

- Successful operation of the experiment will advance the TRL from 4 to 6: the experiment is operated at less than 0.001 g and that the target regolith is contained until impacted by the regolith collector and that video data is recorded of the experiment.
- The regolith collection apparatus is a new device that has been invented and adapted to a pre-existing impact experiment.
- There is no deadline.

Objective of Proposed Experiment

(1) provide information on the efficiency of the regolith collector in microgravity conditions and (2) measure the ejecta that results from the contact between the collector system and the regolith. The reduced-gravity regolith collection experiments will advance the TRL of experiment hardware for future scientific experiments on asteroids.

List the applicable Technology Areas addressed by your technology: TA06, TA07, TA08